

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)**

**CLASS: BE  
BRANCH: IT**

**SEMESTER : V  
SESSION : MO/19**

**SUBJECT: IT5023 SOFTWARE ENGINEERING PRINCIPLES**

**TIME: 3 HOURS**

**FULL MARKS: 60**

**INSTRUCTIONS:**

1. The question paper contains 7 questions each of 12 marks and total 84 marks.
  2. Candidates may attempt any 5 questions maximum of 60 marks.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Explain why do you study Software Engineering. [2]
- Q.1(b) What is a software life cycle model? Which life cycle phase consumes maximum effort? Draw the neat diagram of an Iterative Waterfall Model [4]
- Q.1(c) Draw the Software Curve (ideal and actual). List two examples each for the given category of software: Business software, Web-based software, Embedded software, Customized software. [6]
- Q.2(a) List the four Scrum ceremonies [2]
- Q.2(b) List four important properties of good SRS. Why requirement elicitation is difficult? [4]
- Q.2(c) The implementation of one system (the old) acts as a major ingredient in the specification for the new system” Explain with an example. List the different views of UML. Draw a Use Case Diagram for the Video Store Information System which supports the following business functions: (i)Recording information about videos the store owns. This database is searchable by staff and all customers. (ii)Information about a customer’s borrowed videos Access by staff and also the customer. It involves video database searching. (iii)Staff can record video rentals and returns by customers. It involves video database searching. (iv)Staff can maintain customer, video and staff information. (v)Managers of the store can generate various reports. [6]
- Q.3(a) Draw the hierarchy of Software Testing Levels [2]
- Q.3(b) List the category to which the following software risk belong to: Technology change, Staff turnover, Requirements change and Size underestimate. List three important activities of SPM [4]
- Q.3(c) Who carries out Requirement Analysis and Specification? List the important phases of Requirements Engineering. List three important Functional and Non Functional requirements for the case studies: ATM software and Library Automation System. [6]
- Q.4(a) Explain how Software Architecture different from Software Design. [2]
- Q.4(b) Write a java code to explain the concept of low coupling and high cohesion. [4]
- Q.4(c) Consider a software called RMS calculating software which Reads three integers in the range of - 100 and +100 ,Finds out the root mean square (rms) of the three input numbers and Displays the result. Draw the context diagram and level-1 DFD. What is a Design pattern? Give examples of Design patterns. [1+2+1+2]
- Q.5(a) Draw the UML representation of “Dog is a Animal” [2]
- Q.5(b) Draw a sequence diagram to represent the following interactions between a video store clerk and objects in a video rental system. The scenario name is rent video, Clerk creates new a Rental object named aRental. The message includes arguments for memberID and videoID. aRental sends addMemberToRental message to Member object based on memberID, named aMember, which returns member details.aRental sends rentVideo message to a Video object based on the videoID, named aVideo, which returns video details. aRental returns all rental details to the actor. [4]
- Q.5(c) Draw the class diagram for the case study: The B.E program of BIT Computer Science Department, comprises of many B.E batches. Each B.E batch consists of many B.E students. CSE Department has many listed courses. A course is either listed as an elective course or a core course. Each B.E student credits between 30 to 32 course offering [6]

- Q.6(a) When V model is used? Name GUI and Web UI based software testing tools [2]
- Q.6(b) Consider the following program segment: [2+1+1]
- ```

main(){
int number,index;
printf("Enter a number");
scanf("%d",&number);
while(index<=number-1){
if (number %index==0){
printf("not a prime number");
break;}
index++;}
if(index==number)
printf("prime number");}

```
- (i) Draw a CFG for the above program segment. (ii) Calculate McCabe's Complexity metric using all the methods. (iii) List LIPs.
- Q.6(c) A program takes an angle as input within the range [0,360] and determines in which quadrant the angle lies. Design test cases using equivalence class partitioning method [6]
- Q.7(a) Consider a software project with following important functional units: No of user inputs=30, No of user outputs=40, No of user Inquiries=45, No of internal logical files=08, No of external interface files=05. Assuming all complexity adjustment factors are complex and the weighting factors are average. Compute the FP. [2]
- Q.7(b) List the levels of SEI-CMM. Give different types of software maintenance, their effort distribution and maintenance activities? [1+1+1+1]
- Q.7(c) List the models of COCOMO-II. Use the Basic COCOMO model to estimate efforts and duration of an embedded software development project with size of 60 KLOC. How many workers should be hired for this project? For Embedded:  $a=3.6$ ,  $b=1.2$ ,  $c=2.5$ ,  $d=.32$ . If the project must be completed within 15 months, how many additional workers should be hired? [2+2+2]

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